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# ASSESSMENT OF RICE PROCESSING OPERATIONS IN EKITI STATE, NIGERIA

**Abiodun A. OKUNOLA**

Department of Agricultural and Bio-systems Engineering, College of Engineering, Landmark University, P.M.B 1001, Km. 4 Ipetu Road, Omu-Aran, Kwara state, Nigeria.

**Timothy A. ADEKANYE**

Department of Agricultural and Bio-systems Engineering, College of Engineering, Landmark University, P.M.B 1001, Km. 4 Ipetu Road, Omu-Aran, Kwara state, Nigeria.

**Adejoke D. ADEWUMI**

Department of Agricultural and Bio-systems Engineering, College of Engineering, Landmark University, P.M.B 1001, Km. 4 Ipetu Road, Omu-Aran, Kwara state, Nigeria.

**Festus F. Ashamu**

Department of Sociology, College of Business and Social Science, Landmark University, P.M.B 1001, Km. 4 Ipetu Road, Omu-Aran, Kwara State, Nigeria.

Correspondence E-mail: [adewumi.adejoke@lmu.edu.ng](mailto:adewumi.adejoke@lmu.edu.ng)

## ABSTRACT

*An investigation survey was carried out to examine factors affecting processing and quality of rice in Ekiti State, Nigeria. Nine major towns were selected from six Local Government Areas involved in rice production in the State. A structured questionnaire was used to collect information from three hundred (300) rice processors. Findings revealed that 47% of the processors were males and 53% are females, 66.7% of the processors have family size ranged within 4 to 7 persons, 63.78% of them have only primary education and 22.67% have no formal education, 70% of rice is gotten from middle men and 80% of the processors used their personal savings as capitals. 70% of the milling machines used was obsolete being single pass type characterized with high broken grains and 90% of the processors depend on diesel engines to power the mills while 7% had access to good storage facilities. None of the processors had accesses to a rice destoner. The result obtained is used to improve the processing deficiency of rice in Ekiti State.*

**Key words:** Rice processing; milling machines; rice processors; storage facilities; power source.

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## 1. INTRODUCTION

Rice is consumed by more than 60 percent of the world's population and its total world production is estimated to be 535 million tons. [1]. Rice is a preferred staple food in many developing countries including Nigeria mostly because of its economic significance and also because of favourable government policies in planting it [2], it is widely grown in 5 of Nigeria's ecological zones [3]. The average human consumption is 21kg / year [4]. Nigeria is the most prominent producer of rice in West Africa, and accounts for a production average of 3.2 million tons of paddy and 2 million tons of milled rice [5]. Nigeria is additionally the largest rice consuming nation in West Africa, with its growing demand estimated to be 4.1 million tons as at 2002 and only about half of its demand is met by local or domestic production as reported by [6]. About 3 million metric tons of paddy rice, which constituted 80% self-sufficiency was produced in Nigeria in 2000 [7] and it increased to 3.4 million metric tons in 2009 [8]. Nigerians prefer the locally processed rice because of its taste as well as highly nutritious [9, 10]. Apart from the qualitative deficiencies of pebbles, chaff and broken grains which had been attributed to the low technology input in the processing methods, the product is in short supply. In reality, the demand for local rice is higher in urban areas than rural areas due to higher population and its acceptability as a delicacy in social functions and fast food shop (Okunola). Post-harvest losses are common phenomena in all grain production and it is estimated to occur between 30 – 40% of total productions of all crops in developing countries [11]. These losses occur right from the field during harvesting and throughout the processing operations. Ekiti rice, popularly called *Igbemo* is an upland variety and has gained very wide recognition despite the low physical quality of the product. The noticeable problem now is that of processing activities; parboiling, drying and milling, which are of small scale where special skills and technologies are lacking.

### 1.1. Rice Processing in Nigeria

Nigeria as a developing country has not fully implemented modern methods of rice processing. Most farmers and processors still practice the local or traditional methods [7]. Harvesting is done when 80% of the grain has turned to straw colour. The harvested rice are packed from the field immediately or tied into bundles and placed upright to avoid them from coming in contact with the moist soil and also preventing the germination of the paddy which have little or no dormancy. High grain losses and poor quality of Nigerian rice has been attributed to the use of little or no technology input during its production [12, 15], Processing of rice is basically divided into two methods- traditional and modern methods. Traditional method involves beating or gentle pounding with a pestle and mortar to remove grain from straw while the modern method involves threshing and milling. Processing of paddy is only milled where raw paddy rice is concerned or parboiled, dried and milled for parboiled paddy rice. Polishing / whitening may be done to further improve the appearance, though some nutritious part is removed [14, 13, 15]. Rice processing requires special skills because large percentages of broken rice are not desirable in commercial packages, yet rice is brittle, nearly one-third may be broken during milling and have to be sold at a lower price [15]. Milled rice consists of approximately 90% carbohydrate, 90% protein and 1% fat and fiber [10].

Rice processing in Ekiti State involves the following steps;

1. The crop is harvested at crop maturity, depending on the specie grown.
2. The produce is exposed to sun for drying in the field.
3. The threshing process is carried out afterwards in order to detach the paddy rice from the grain head.
4. The produce is then packaged (bagged) for transportation to the processing center

5. The first processing operation carried out at the rice processing center is parboiling.
6. The grain (rice) is then sun-dried afterwards.
7. After the rice has been properly dried, the milling (de-husking) process starts.
8. After the milling process, winnowing and cleaning of the rice starts, after which it is bagged and stored as desired.

Objectives of this study were to assess the present level of rice processing, identify constraints in rice processing and to identify deficient skills in rice processing in Ekiti State, a major rice producing state in South West of Nigeria. The result of this study can be utilized in ensuring the successful operation of post-harvest activities of rice by dwelling more on the processing stages with little or no level of mechanization.

## 2. METHODOLOGY

### 2.1. Area of Study

This study was carried out in rice producing towns in six local Government Areas (LGAs) at Ekiti State, Nigeria. The LGAs are Efon Alaye, Irepodun / Ifelodun, Ido / Osi, Gboyin, Oye and Ikole. These study regions accommodates about 44.2% of the state populace. Systematic sampling techniques were used to select nine towns in the State; namely, Erio, Afao. Igbemo, Ode, Ijan, Efon Alaye, Ikere, Oye and Ikole. Three Hundred (300) respondents were arbitrarily chosen from the study region. The data collected were analyzed and interpreted by using descriptive statistics.

## 3. RESULTS

### 3.1. Gender of Processors and Processing Activities

Figures 1 and 2 shows that 141 males (47%) and 159 females (53%) were involved in rice processing in the study areas. 264 (88%) women and 36 (12%) of men were involved in winnowing, 252 (84%) women and 48 (16%) men were involved in parboiling, (84%) and 36 (12%) women and 264 (88%) men engaged mostly in milling (88%) activities.

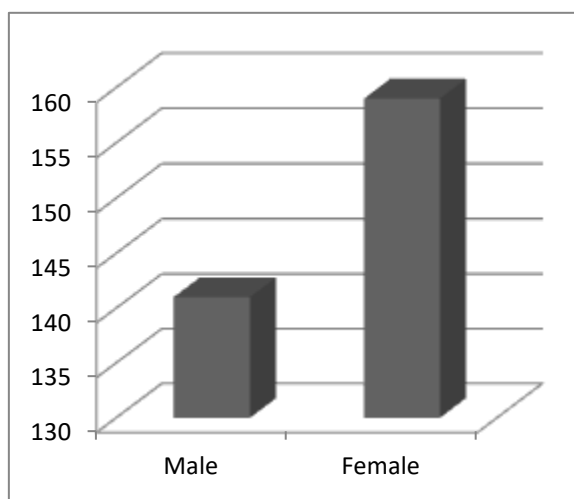


Figure 1 Gender of processors

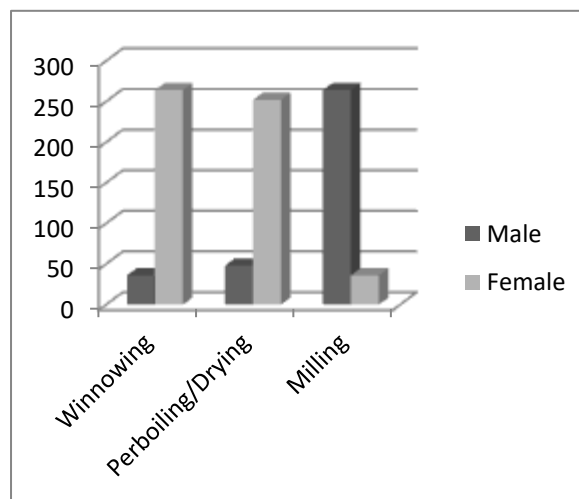
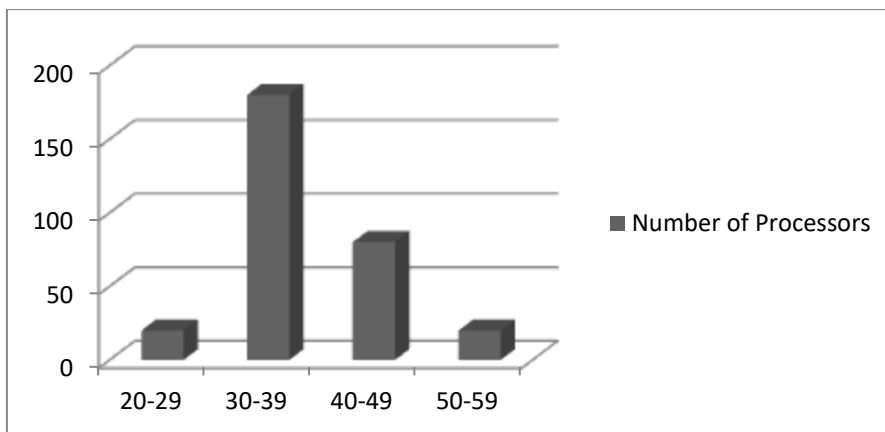


Figure 2 Group of processors with gender

### 3.2. Age of Processors

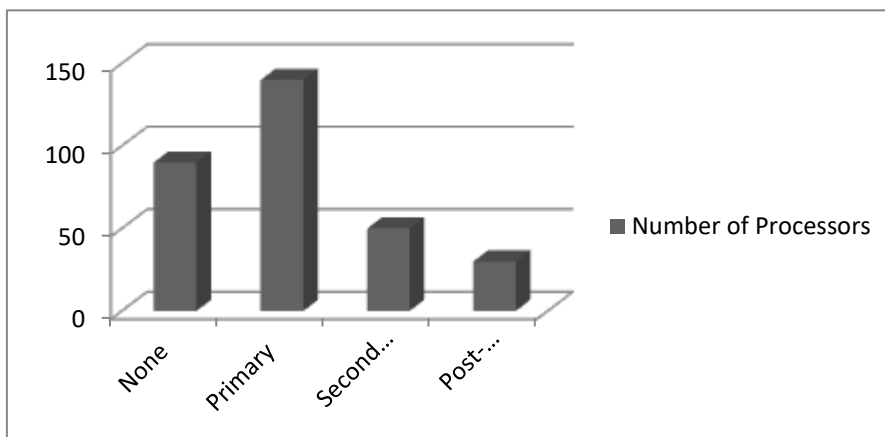
As highlighted in figure 3, 20 processors range between the age of 20-29 years, 180 between the ages of 30-39 years, 80 between the ages of 40-49 years and 20 between the ages of 50-59.



**Figure 3** Age of Processors

### 3.3. Educational Background of Processors

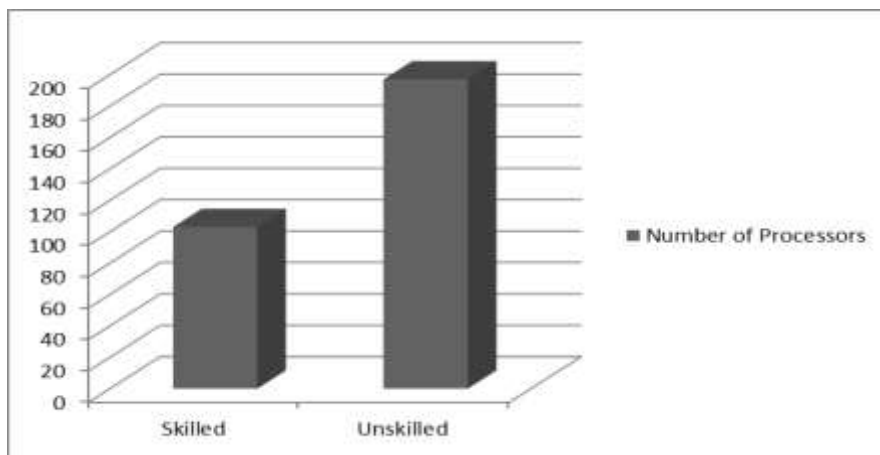
Educational backgrounds of rice processors in the study area are presented in Figure 4. 90 respondents had no formal education, 140 of them had primary school education, 50 of them had secondary education and just 20 had post-secondary education.



**Figure 4** Education level of Processors

### 3.4. Labour Status of Processors / Respondents

About 103 of respondents have attained the skilled labour status while the remaining 197 are unskilled as shown in figure 5.



**Figure 5:** Labour Status

### 3.5. Sources of Power for Rice Milling

Sources of power for rice milling are presented in Figure 6. 186 of the respondents used petrol and/or diesel fuel for milling operations, only 28 depended solely on electricity, 10 of the rice processors use electricity, petrol and diesel and 20 of the processors still use the manual process.

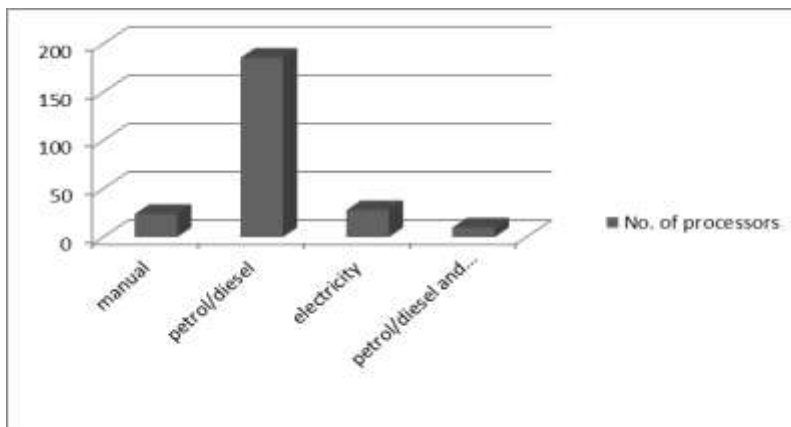


Figure 6: Source of power for rice milling

### 3.6. Sources of Capital

Figure 7 shows sources of capital of the rice processors. 237 of the processors depend on their personal savings; 32 obtained cooperative loan; 15 were assisted by the State government through Government Assisted Project Loan; 12 of the respondents were assisted by their family members while only 4 of the processors obtained bank loans.

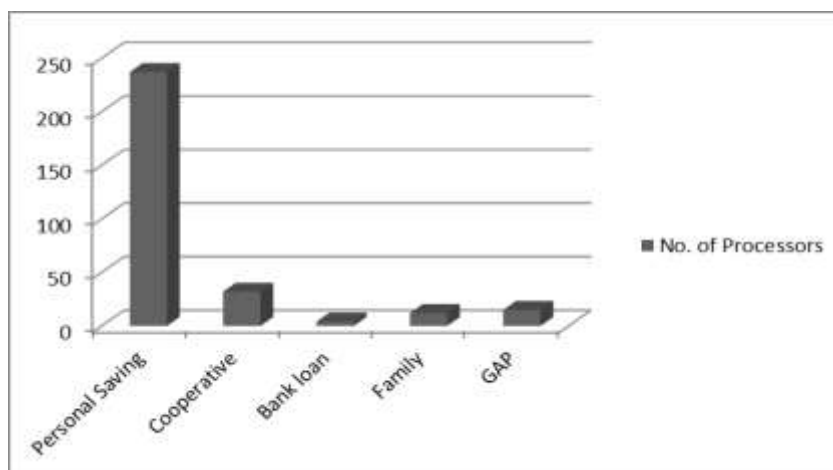


Figure 7: Source of Capital

### 3.7. Level of Storage Facilities

It was discovered that majority, that is 234 (78%) of the processors lack storage facilities while only 66 (14%) had storage facilities.

## **4. DISCUSSIONS**

### **4.1. Gender of Processors and Processing Activities**

From the result obtained and as stated by [16], the credibility of women important roles in the production of agricultural products around the world can also be viewed in Nigeria, where about 60-80% of the labour activities carried out on the farm are done by women (that is, right from the planting process till the product gets to the final consumer) and they also account for two-thirds of food crops produced in the country [17]. The results obtained also agreed with that of [18], who also stated that the major rice processing activity is parboiling/ drying and it is mostly populated by women.

### **4.2. Age of Processors**

According to the results obtained, most of the respondents are between the ages of 30-39 which indicates that most of the processors are in their productive years. This agrees slightly with [19] whom according to their research got a result indicating that rice processors within the age bracket of 31-35 years contain 54.2% of the total number of rice processors in Kano state.

### **4.3. Educational Background of Processors**

A large number of rice processors have little formal education and this may make it difficult for them to understand the technicalities involved in rice processing which thereby affects the quality of rice processed and incurs large amounts of losses since they are unable to use modern rice processing machineries.

### **4.4. Labour Status of Processors/Respondents**

Majority of the rice processors have little or no form of formal education and hence most of them do not have the required know-how to operate rice processing machines. This encourages the manual and crude way of processing rice. [18] agreed with this and stated that majority of rice processors lack formal training which results in processing tools being predominantly local. This implies that unskilled and cheap labor is vastly available in rice processing.

### **4.5. Sources of Power for Rice Milling**

Many of the respondents preferred diesel fuel (though it costs more than petrol) because of the epileptic power supply in Nigeria and the incessant scarcity of petrol.

### **4.6. Sources of Capital**

Lack of adequate capital is a significant factor limiting rice processing in the study area. These rice processors could not access bank loans due to many factors like illiteracy and high interest on loans. State government and banks should assist these processors so as to boost their production.

### **4.7. Level of Storage Facilities**

Lack of storage facilities is another major constraint to rice processing as processors produce at a really low level to reduce wastage or deliberately delay processing operations till market days when buyers are ready to buy. These subjects rice to contaminations whereas processors who had storage facilities could employ skilled labour and produce large quantities. The result obtained agrees with [20], who stated that one of the common constraints faced by processors is the availability of storage facilities to prevent losses and prolong the shelf life of paddy.

Also [21] stated that rice locally produced and processed in Nigeria is usually characterized with high percentage of broken grains and impurities which impairs its quality and attracts low market value.

## 5. CONCLUSIONS

This study assessed level of rice processing as well as constraints in Ekiti State, a major rice producing state in South West of Nigeria. The constraints identified are as follows

- Low level of education.
- Inadequate capital affected the level of production of the respondents,
- Lack of storage facilities,
- Cost of rice processing machines,
- High cost of fuel and
- Contaminations most especially stones

## 6. RECOMMENDATIONS

In order to improve the efficiency and effectiveness of rice production in the study area, the following recommendations are made:

- Government should make storage facilities available and accessible to rice processors in a bid to increase production.
- Efforts must be made to collaborate with the stake holders and ensure training programmes for skill acquisition (workshops, seminars) are conducted regularly on standard processing techniques to educate rice producers.
- Modern milling machines (multi-pass) and de-stoners at subsidized rates should be made available to the rice processors to improve the quality and quantity of local rice thereby improving the market value.
- The Government should collaborate with some research institutes such as National Centre for Agricultural Mechanization (NCAM), Nigeria Cereal Research Institute, Baddegi, Nigerian Institute of Social and Economic Research (NISER) as well as Agricultural Rural and Management Training Institute (ARMTI) to fabricate affordable rice processing plants locally and establish extension services with engineering component for operations and maintenance.
- Research works on removing stones and other foreign materials from locally produced rice should be encouraged.

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